



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/612,133	07/02/2003	Mervyn John Miles	SHP-PT077	3323
3624	7590	10/10/2007		
VOLPE AND KOENIG, P.C. UNITED PLAZA, SUITE 1600 30 SOUTH 17TH STREET PHILADELPHIA, PA 19103			EXAMINER LUU, THANH X	
			ART UNIT 2878	PAPER NUMBER
			MAIL DATE 10/10/2007	DELIVERY MODE PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/612,133

Applicant(s)

MILES ET AL.

Examiner

Thanh X. Luu

Art Unit

2878

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 16 August 2007.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-19 and 21-25 is/are pending in the application.
- 4a) Of the above claim(s) 22 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-19, 21 and 23-25 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date <u>08/16/2007</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

This Office Action is in response to amendments and remarks filed August 16, 2007. Claims 1-19 and 21-25 are currently pending. Claim 22 has been withdrawn.

1. This application contains claim 22 drawn to an invention nonelected with traverse in the reply filed on July 7, 2005. A complete reply to the final rejection **must** include **cancellation** of nonelected claims or other appropriate action (37 CFR 1.144) See MPEP § 821.01.

Claim Rejections - 35 USC § 112

2. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

3. Claim 24 is rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

It is unclear where Applicant originally discloses "to form an image corresponding to variations of the measured parameter along each scan line."

Claim Rejections - 35 USC § 102

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

Art Unit: 2878

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

5. Claims 21 and 23, as understood, are rejected under 35 U.S.C. 102(b) as being anticipated by Betzig (U.S. Patent 5,254,854).

Regarding claim 23, Betzig discloses (see Figs. 1 and 8) a scanning probe microscope and method for scanning a sample by means of interaction between the sample and the probe, comprising: driving means (50, 40) arranged to provide relative motion between the probe and the sample surface and capable of bringing the same and probe into close proximity; means for oscillating (40) either the probe or the sample in order to provide relative oscillatory motion (160; see Fig. 8 and col. 3, lines 10-12) of the probe across the surface; and at least one of a probe detection mechanism (80) arranged to measure at least one parameter indicative of strength of the interaction between the probe and the sample for imaging the sample; the microscope is arranged, in operation, to carry out a scan of the sample surface wherein scan area is covered by an arrangement of scan lines (see generally Fig. 8), each scan line (not shown; created by dithering) provided by laterally oscillating (see col. 3, lines 10-12) either the probe or the sample near resonant frequency (see col. 3, lines 25-30). The oscillation amplitude inherently determines a maximum scan line length. The scan line is continuously read by the detector (see col. 5, line 60- col. 6, line 5; the position-sensitive optical detector is sensitive to the dither motion).

Regarding claim 21, Betzig discloses the claimed invention as set forth above. Betzig further discloses (see col. 5, lines 35-50) monitoring a parameter (shear force) and adjusting the separation distance (height of the tip above the sample) in order to

Art Unit: 2878

drive the value of the monitored parameter back towards the set value (constant shear force).

Claim Rejections - 35 USC § 103

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

7. Claims 1, 3, 12-18, 24 and 25, as understood, are rejected under 35 U.S.C. 103(a) as being unpatentable over Betzig in view of Elings (U.S. Patent 6,008,489).

Regarding claims 1, 3, 12, 14, 17, 18, 24 and 25, Betzig discloses the claimed invention as set forth above. Betzig also disclose (see col. 3, lines 10-15) the parameter is an oscillation amplitude; and (see Fig .8) scanning a rectangular area as claimed. Since shear force imaging generates an image, an image is formed corresponding to variations of the measured parameter (shear force) along each scan line. The scan in Betzig is also raster scanned. Since the raster scan in Betzig is further dithered, as understood, each scan line is a "component" of the raster scan. Betzig does not specifically disclose responding to a variation in an average value of the at least one parameter. Elings et al. teach (see claim 48) averaging values. Thus, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to provide average values in the apparatus and method of Betzig in view of Elings et al. to provide more accurate and precise adjustment and detection.

Regarding claims 13 and 15, Betzig in view of Elings et al. disclose the claimed

invention as set forth above. Betzig and Elings et al. do not specifically disclose a tuning fork as claimed. However, choosing a particular type of oscillator is a matter of design choice. Furthermore, tuning forks are notoriously well known in the art. It would have been obvious to a person of ordinary skill in the art at the time the invention was made to choose a tuning fork as claimed in the apparatus and method of Betzig in view of Elings et al. to provide more stability as well known.

Regarding claim 16, Betzig in view of Elings et al. disclose the claimed invention as set forth above. Betzig and Elings et al. do not specifically disclose a time constant as claimed. However, choosing a particular time constant is a matter of design choice. It would have been obvious to a person of ordinary skill in the art at the time the invention was made to choose time constant values as claimed in the apparatus and method of Betzig in view of Elings et al. to sufficiently react to changing conditions and obtain improved detection.

8. Claims 1-4, 6-19, 21 and 24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kley (U.S. Patent 6,752,008) in view of Betzig and Elings et al.

Regarding claims 1, 3, 7-12, 14, 17-19, 21 and 24, Kley discloses (see Figs. 1 and 3) a scanning probe microscope and method for scanning a sample by means of interaction between the sample and the probe, comprising: driving means (22) arranged to provide relative motion between the probe and the sample surface and capable of bringing the same and probe into close proximity; means for oscillating (18) either the probe or the sample in order to provide relative oscillatory motion (see Fig. 3) of the probe across the surface; and at least one of a probe detection mechanism (24)

Art Unit: 2878

arranged to measure at least one parameter indicative of strength of the interaction between the probe and the sample for imaging the sample; the microscope is arranged, in operation, to carry out a scan of the sample surface wherein scan area is covered by an arrangement of scan lines (see Fig. 3), each scan line provided by laterally oscillating either the probe or the sample at a frequency. The oscillation amplitude inherently (see Fig. 3) determines a maximum scan line length. Kley also discloses (see Figs.) an AFM cantilever and actuator as claimed. Kley does not specifically disclose a feedback mechanism or oscillating at or near a resonant frequency. Betzig teaches (see col. 3, lines 25-30 and col. 5, lines 35-50) oscillating a resonant frequency and providing feedback as claimed. It would have been obvious to one of ordinary skill in the art at the time the invention was made to provide feedback and oscillate a resonant frequency in the apparatus and method of Kley in view of Betzig for improved stability. Kley also does not specifically disclose responding to a variation in an average value. Elings et al. further teach (see claim 48) averaging values. Thus, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to provide average values in the apparatus and method of Kley in view of Betzig and Elings et al. to provide more accurate and precise adjustment and detection.

Regarding claims 2 and 4, Kley in view of Betzig and Elings et al. disclose the claimed invention as set forth above. Kley does not specifically disclose measuring capacitance. Elings et al. further teach (see col. 1, line 26) that it is conventional to measure deflection by measuring capacitance. Thus, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to measure

capacitance in the apparatus and method of Kley in view of Betzig and Elings et al. as desired for efficient and effective deflection detection.

Regarding claim 6, Kley in view of Betzig and Elings et al. disclose the claimed invention as set forth above. Kley does not specifically disclose measuring a magnetic field. Elings et al. further teach (see col. 2, lines 35-40) that it is conventional to use such probes to measure magnetic fields. Thus, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to measure magnetic fields in the apparatus and method of Kley in view of Betzig and Elings et al. to provide further functionality as desired.

Regarding claims 13, 15, 18 and 19, Kley in view of Betzig and Elings et al. disclose the claimed invention as set forth above. Kley, Betzig and Elings et al. do not specifically disclose a tuning fork as claimed. However, choosing a particular type of oscillator is a matter of design choice. Furthermore, tuning forks are notoriously well known in the art. It would have been obvious to a person of ordinary skill in the art at the time the invention was made to choose a tuning fork as claimed in the apparatus and method of Kley in view of Betzig and Elings et al. to provide more stability as well known.

Regarding claim 16, Kley in view of Betzig and Elings et al. disclose the claimed invention as set forth above. Kley, Betzig and Elings et al. do not specifically disclose a time constant as claimed. However, choosing a particular time constant is a matter of design choice. It would have been obvious to a person of ordinary skill in the art at the time the invention was made to choose time constant values as claimed in the

apparatus and method of Kley in view of Elings et al. to sufficiently react to changing conditions and obtain improved detection.

9. Claim 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kley in view of Betzig and Elings et al., and further in view of Ookubo (U.S. Patent 6,614,227).

Regarding claim 5, Kley in view of Betzig and Elings et al. disclose the claimed invention as set forth above. Kley, Betzig and Elings et al. do not specifically disclose the specific capacitance probe detection mechanism as claimed. Ookuba teaches (see Fig. 9) a capacitance probe detection mechanism having a resonator (101) and voltage modulator (201, 202) as claimed. It would have been obvious to a person of ordinary skill in the art at the time the invention was made to provide such a configuration as claimed in the apparatus and method of Kley in view of Betzig and Elings et al. to effectively implement capacitance detection as desired for deflection detection.

Response to Arguments

10. Applicant's arguments filed August 16, 2007 have been fully considered but they are not persuasive.

Applicant asserts that the terms "scan line" should be given its recognized meaning of "a line or linear path, which may be curved or straight, across a sample that is followed by a probe as it gathers information related to the sample and directly relates to a corresponding line or linear portion of the image" (see Remarks 08/16/07 at pg. 15) as set forth in the declaration of February 5, 2007. Examiner disagrees. First, nowhere in the Declaration is such a specific definition set forth. Second, this definition is directly contradicted by Applicant's own withdrawn claim 22. There is no imaging in withdrawn

claim 22 as the claim is drawn to writing information; yet, the same term "scan line" is used. Examiner invites Applicant to explain this discrepancy. Rather, Examiner believes Applicant only initially intended "scan line" to simply mean a linear path. But, when an anticipating prior art was cited against the invention, Applicant subsequently argued for a narrower definition of "scan line." This is impermissible because there is no support in the original disclosure for such an arbitrary definition. Therefore, the broadest reasonable interpretation of the term "scan line" is the correct one to use. Examiner recommends that Applicant structurally distinguish over that prior art rather than argue over semantics.

Even if such a definition is used, the prior art reads on Applicant's invention. The device in Betzig discloses shear force imaging and NSOM imaging. (col. 6, lines 8-9). In shear force imaging the dithering position of the probe is detected (based on changes to the shear forces) to generate a shear force image. In order to generate an "image", by definition, the data gathered has be directly related to the image being generated. That is, there is a one-to-one correspondence between gathered data and generated image. Applicant's concern about reading a plurality of points is moot since such language is no longer in the claims.

Thus, as set forth above this rejection is proper.

Conclusion

11. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37

CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Thanh X. Luu whose telephone number is 571-272-2441. The examiner can normally be reached on M-F 6:00AM-3:30PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Georgia Epps can be reached on 571-272-2328. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a

Application/Control Number: 10/612,133

Page 11

Art Unit: 2878

USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Thanh X Luu/
Primary Examiner
Art Unit 2878

09/2007